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Management of infections in type 2 diabetes from the patient's perspective: A qualitative approach

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ABSTRACT

Aim: To explore the knowledge, and health beliefs of patients with type 2 diabetes mellitus (T2DM) regarding management of infections of the urinary tract (UTIs) and lower respiratory tract (LRTIs).

Methods: Three semi-structured focus groups with 23 patients with T2DM were conducted and analyzed.

Results: Only a few patients mentioned specific preventive measures for UTIs and LRTIs, like not smoking and taking enough fluids ($n=3$). Making a nuisance of oneself, denying the seriousness of the disease and fear of insulin therapy were barriers to health-seeking behaviour. Some people did not complete the course of antibiotics ($n=2$) or forgot to take the tablets, especially when tablets had to be taken more than once a day ($n=4$).

Conclusion: Our results showed that patients with T2DM lack knowledge and realistic health beliefs about common infections such as UTIs and LRTIs. Health education should aim to help patients with T2DM to interpret symptoms of infections correctly in order to take the appropriate action such as taking preventive measures or taking antibiotics. Identifying patients at high risk of a complicated infection may target education towards those who need it most.

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1. Introduction

Patients with type 2 diabetes mellitus (T2DM) have an increased risk of urinary tract infections (UTIs) and lower respiratory tract infections (LRTIs) compared with non-diabetic individuals (by 21% and 30%, respectively) [1,2]. Moreover common infections may be more difficult to treat and recur more

often. Indeed, the risk of recurrence is even higher than the risk of a first episode of an infection (43% for UTIs and 57% for LRTIs) [1]. Diabetes is also associated with an increased risk of hospitalization and death due to infections [3,4]. The costs associated with these infections are high [5,6].

Appropriate management might reduce the burden of common infections but to date, health care providers have not paid

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special attention to these infections in patients with T2DM. Patients may be insufficiently aware of the potential seriousness of such infections and often wait several days before seeking medical attention for UTIs [7], or stop antibiotic therapy prematurely once symptoms have resolved [8].

Little is known about the knowledge and health beliefs of patients with T2DM regarding measures to prevent infections, when to seek medical attention, and compliance with antibiotics. For example, do patients with T2DM think they have an increased risk of infection, do they understand the role of antibiotics in treating infections and possible complications of antibiotic treatment and do they go to their GP if they notice symptoms of infections. The aim of this study was to explore the knowledge and health beliefs of patients with T2DM regarding the management of UTIs and LRTIs.

2. Methods

Because of the exploratory character of the study, semi-structured focus groups were held, which provided the opportunity to explore knowledge, beliefs and possible misconceptions of individuals with T2DM. Moreover, the interaction between subjects in the groups led to the expression of a wider variety of opinions than might be the case if subjects were interviewed individually or completed questionnaires.

2.1. Participants

There were three focus groups of in total 23 participants with T2DM. The participants of two focus groups were recruited by the Dutch Diabetes Patient Association (DDPA) ($n=10$ and $n=9$). They were active members of the DDPA and lay diabetes educators, i.e. they had T2DM and had followed a course run by the DDPA on providing patient information and education. They answered telephone questions raised by patients. The other focus group consisted of participants recruited by a general practitioner (GP) ($n=4$). Baseline characteristics are given in Table 1. Inclusion criteria for all groups were: (1) a history of diabetes of three or more years, (2) age 45 years or older, (3) sufficient physical and mental condition to attend the meeting, and (4) adequate knowledge of the Dutch language. We took care to recruit participants that differed by age, sex, duration of diabetes, number and severity of complications, treatment, health region and urban or rural residency. Exclusion criteria were a recent accident or presence of severe co-morbidity.

2.2. Data collection

The aim and procedure of the meeting were explained by the moderator, who was aware of the study objectives. He tried to involve all group members in a discussion of three different kinds of behaviour: taking preventive measures, seeking medical attention and compliance with antibiotics. Two observers gathered information about non-verbal communication and inter-participant interactions. The structure of the meetings is given in Table 2. The moderator read out statements to which the participants could express agreement or disagreement using green and red cards. Participants were then asked to explain their choice, which helped promote group discussion.

Table 1 – Baseline characteristics of patients with type 2 diabetes.

	Focus groups ($n=23$) % (n)
Age (mean)	64
Male gender	57 (13/23)
Having a partner	86 (19/22)
Educational level ^a	
High	50 (11/22)
Middle	41 (9/22)
Low	9 (2/22)
Duration of diabetes (mean)	16
General practitioner is main diabetes care provider	39 (9/23)
Specialist is main diabetes care provider	57 (13/23)
Type of treatment for diabetes	
Insulin	74 (17/23)
Oral medication	65 (15/23)
Cystitis or prostatitis in previous five year(s)	61 (14/23)
Pyelonephritis in previous five year(s)	0 (0/23)
Pneumonia in previous five year(s)	57 (13/23)
Hospitalization as result of an infection ^b	74 (17/23)

^a High: Senior general secondary, pre-university and technical and vocational for 18+ and university. Middle: Lower general secondary or technical and vocational for 12–16 and 16–18 years old. Low: Primary school or no education.

^b Defined as ever.

Table 2 – Structure of the focus group sessions.

Taking preventive measures and seeking medical attention
St 1: Infections are more of a problem in diabetic patients. Q: Why do you think this is the case?
Q: Do you think that:
Infections are more common in diabetes?
Infections lead to changes in blood glucose levels?
Diabetes increases the need for hospitalization for infections?
St 2: I can do a lot to prevent infections. Q: Why do you think this?
What precautions do you take?
Q: Have you had the flu jab? What do you think of it?
Q: Do your family and friends help you to try to prevent infections?
St 3: I sometimes join in group activities even though this may increase the risk of infection.
Q: Can you tell us why you do this?
St 4: If I get symptoms that could mean I've got an infection, I go to the GP immediately.
Q: Can you explain why?
Q: Thinking of the most serious infection you have had, do you think you should have gone to the GP earlier? Why do you think you should have?
St 5: Patients with diabetes take good care of their health and are cautious about when they might have an infection. But when visiting GPs, these sometimes just wait and see.
Q: Why do you think they do this?
Compliance with antibiotics
St 6: GPs are too ready to prescribe antibiotics.
Q: Why do you think this is the case?
Q: If you have to take antibiotics three times a day, do you so? If not, what would make it easier for you to take the antibiotics as prescribed?
Q: What do you think about the benefits of antibiotics?

Abbreviations: Q: Question(s); St: Statement; GP: general practitioner.

Moreover, open-ended questions were used. The sessions lasted two hours and were tape-recorded with the consent of the participants [9,10].

2.3. Data analysis

All tapes were transcribed verbatim for analysis and transcripts were studied separately and independently by two researchers (OB, LV). The transcript for each group was ana-

lyzed using the method of Krueger [11]. First, all sections relevant to the research questions were identified. The next step was to generate categories that expressed the content of the sections from the perspective of the focus of the research. Separate categories were used when lay diabetes educators expressed the views of other patients. The results were summarized and discussed until agreement was reached. We used WinMAX 98 Pro qualitative data analysis software to record and compare coding of transcripts.

Table 3 – Quotes from the focus group participants.

Knowledge

'If it was known how infections could be prevented, I would take the necessary preventive measures. But it's not, and I don't know what I should do.' (female, 69 years, non-member DDPA)

'Don't see or visit people who have the flu. Make sure your glucose levels are OK, take vitamins, get enough sleep, and try to have a healthy lifestyle, exercising...' (female, 61 years member DDPA)

Perceived susceptibility

'I'm almost 70 years, so my general resistance might be lower and this might be why I have a higher risk of getting serious infections. ... I suspect it's because of my diabetes, but I'm not sure about that.' (male, 69 years, member DDPA)

'My sister-in-law also had pneumonia, but she doesn't have diabetes. It was just an epidemic. I think anyone can get the flu.' (female, 69 years, non-member DDPA)

'I sometimes get pneumonia, but so do other people without diabetes.' (female, 56 years, non-member DDPA)

Perceived severity

'I think that the consequences of bronchitis are more serious in diabetes.' (female, 56 years, member DDPA)

'I often get infections and they seem to last much longer than in other people. Whereas other people get better in a week, it takes me four to five weeks.' (male, 75 years, member DDPA)

Perceived severity

'I see a lot of people with diabetes who don't take their bladder infection very seriously. They think it has nothing to do with diabetes.' (female, 71 years, member DDPA)

'I've had bladder infections much more often the last 3 years. But I don't know whether this is because I have diabetes.' (female, 69 years, non-member DDPA).

Perceived benefits

'Getting the flu jab is a good idea. If I get a cold now, it doesn't develop into a serious illness' (male, 61 years, non-member DDPA)

'Since I had the flu jab, I haven't had the flu.' (male, 47 years, member DDPA)

'You have fewer flu complications if you've had the flu jab. Before I was vaccinated, I always developed pneumonia when I had the flu. Now I don't.' (female, 56 years, member DDPA)

'I feel more at ease now when I go to the doctor' (male, 61 years, non-member DDPA)

'Since I got diabetes, I've had more bladder infections and I'm more alert about them. I'm getting wiser!' (female, 56 years, member DDPA)

'If the antibiotics have to be taken for a short time, say a week, and I don't have to take any other medication, I can cope with it.' (male, 61 years, member DDPA)

'If I had to take antibiotics, taking them once a day would be the easiest for me.' (male, 51 years, member DDPA)

'My temperature goes down quickly on the second day when I'm taking antibiotics' (female, 56 years, member DDPA)

'I was glad when I was prescribed antibiotics' (female, 56 years, non-member DDPA)

Perceived barriers

'I was brought up not to moan, to just carry on. It will get better on its own. And then it's sometimes too late. Yes, I hate going to my doctor, I feel I'm whining.' (female, 62 years, non-member DDPA)

'I was in time, but the doctor. he just didn't take the infection seriously.' (male, 48 years, member DDPA)

'I sometimes forget to take the antibiotics, but I do try to follow the instructions carefully. It's more difficult at work.' (male, 51 years, member DDPA)

'People often don't go to the doctor in time because they are afraid that they may have to start using insulin' (female, 56, member DDPA)

'Normally, I just walk to the cupboard where the antibiotics are kept. But if I'm going out, things go wrong.' (female, 57 years, member DDPA)

Social support

'My wife is the most important person for helping me prevent infections.' (male, 65, member DDPA)

'I think people close to me, my family and the neighbours are most important in helping me prevent infections. For example, when it came to getting the flu jab' (male, 65 years, member DDPA)

'My family, friends and acquaintances aren't concerned about whether I take my antibiotics and how I can prevent infections. My doctor has the most influence on whether I complete a course of antibiotics.' (female, 56 years, non-member DDPA)

'Except for my wife, of course, my doctor is most important in helping me to take antibiotics.' (male, 51 years, member DDPA)

'I do it myself. I don't need to rely on my family to get me to take antibiotics.' (female, 56 years, non-member DDPA)

Abbreviation: DDPA, Dutch Diabetes Patient Association.

3. Results

3.1. Participants

Of the 23 participants, 13 (57%) were male. The mean age was 64 years (SD 8 years), the mean duration of diabetes was 16 years (SD 12 years), 50% of the participants had a high education level and 74% used insulin with or without glucose-lowering agents (Table 1). The GP was the main diabetes care provider for 39% of the participants. Representative quotes from the focus group participants are included in Table 3.

3.2. Taking preventive measures and seeking medical attention

3.2.1. Knowledge

Although most participants ($n=18$) mentioned a healthy lifestyle as a measure for preventing infections, only a few participants ($n=3$) mentioned specific measures such as not smoking and taking enough fluids. Some people were not aware of any preventive measures at all ($n=4$). A few participants confused influenza with having a cold ($n=2$).

3.2.2. Perceived susceptibility and severity

In general, patients believed that infections last longer, and are more frequent and more serious in people with diabetes than in people without diabetes. Most participants ($n=20$) thought that blood glucose levels influenced the occurrence and course of infections and vice versa, but they were not sure whether diabetes was associated with a higher risk of more serious infections. Patients who said that they had had no or fewer infections ($n=3$), considered infections as being less serious than did patients who had had several infections.

3.2.3. Perceived benefits and barriers

Whether a participant had had an influenza vaccination or not was influenced by his or her awareness of being at risk and the belief that vaccination would prevent influenza. Despite having signs or symptoms of an infection, patients often delayed going to seek medical attention for several reasons, such as being worried about being considered a nuisance, denial of the seriousness of the disease, anxiety about being put on insulin therapy, distrust of their general practitioner, poor accessibility of the general practice and lack of time and experience. Half of the patients did not appreciate their GP's approach of 'watchful waiting'. They sometimes felt ignored by the doctor or practice assistant, which some ascribed to the lack of knowledge of the GP or the GP being hurried.

3.2.4. Social support

The partner was the most important source of social support when it came to preventing infections. Some participants did not experience any support from their social environment ($n=3$). Participants mentioned receiving encouragement from their neighbours and friends, and especially other people with diabetes, for example, to go and have an influenza vaccination.

3.3. Compliance with antibiotics

3.3.1. Knowledge

Because of a lack of knowledge, some people did not complete the course of antibiotics ($n=2$). Some admitted forgetting to take the tablets, especially when tablets had to be taken more than once a day ($n=4$).

3.3.2. Perceived benefits and barriers

Antibiotics were generally thought to be effective. People who had a job mentioned that it was difficult to be compliant with antibiotics. Participants mentioned several 'tricks' to help people to remember to take their tablets on time: tying a knot in one's handkerchief; keeping the antibiotics in a place where they can be seen, such as on the table; setting an alarm; putting the antibiotics in a bag the evening before going out the next day; using a pillbox; putting a reminder on the front door; putting the antibiotics in a sandwich. Most patients said that they often forgot verbal instructions given by their GP ($n=16$) and recommended that someone should always accompany the person when he/she visited the GP, to take notes and to record the GP's advice.

3.3.3. Social support

Apart from the GP, partners were the most important people to help patients with their antibiotic compliance, for example, by reminding patients to take their tablets. However, two patients specifically said that they did not want the assistance of others, that they wanted to take responsibility for this themselves.

4. Discussion

Patients with T2DM have an increased risk of UTIs and LRTIs compared with non-diabetic individuals. To our knowledge, health education for patients with T2DM does not pay special attention to infections, their signs and symptoms and the importance of prevention, treatment and treatment adherence. Such education may be very important, since we know from the literature that health-seeking behaviour is often delayed by perceived barriers, misconceptions about the seriousness of the disease or by lack of social support [12,13]. This is consistent with the results from the focus groups showing that patients with T2DM lack basic knowledge regarding risk factors for UTIs and LRTIs, which means that it might be difficult for these patients to interpret symptoms correctly and to take the appropriate action such as prevention or treatment. Besides, patients who had had no or fewer infections considered these as being less serious. This may cause delay in seeking medical care, since not perceiving oneself prone to illness is a well-known barrier which can inhibit consultation of the doctor [14]. During the focus groups it appeared that patients were not always aware that treatment should be continued even though symptoms have disappeared, as has been found in other studies [8,15].

Non-compliance with antibiotics may increase the resistance to antibiotics, the risk of recurrence of UTI and LRTI and also increase the accompanying risk of hospitalization and mortality [16,17]. Identifying patients at high risk of a com-

plicated infection by means of prediction rules [18,19] may help nurse educators and primary care physicians to target additional efforts towards those people with T2DM in most need.

A potential limitation of this study is that the characteristics of the study participants were different from those of the general population of Dutch patients with T2DM [20]. The participants of our study had had diabetes for a long duration (16 years), they often used insulin, a sign of a more advanced disease [21] (74%) and they were highly educated (50%). However, their role as lay patient educators made them valuable participants to discover issues of importance to patients with T2DM.

Furthermore, although non-compliance with antibiotic therapy is common [15] most of our participants with T2DM, said that they had taken antibiotics as prescribed. We cannot exclude that this high compliance was, in part, due to socially desirable responding [15].

In conclusion, during focus group meetings, patients with T2DM seemed to lack knowledge and realistic health beliefs about common infections such as UTIs or LRTIs. Health education should aim to help patients with T2DM to interpret symptoms of infections correctly in order to take the appropriate action such as taking preventive measures or taking a complete course of antibiotics. Identifying patients at high risk of a complicated infection by means of prediction rules may target education towards those in most need.

Ethics approval

This study complies with the rules for ethical conduct of research according to the Dutch law of medical scientific research. Ethical approval is, according to this law, not necessary.

Conflict of interest

The authors state that they have no conflict of interest.

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